The opinion in support of the decision being entered today was ***not*** written for publication and is ***not*** binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte CHANCE GLENN, ROGER KAUL, LOUIS JASPER Jr., GEORGE BERGERON III and DOUGLAS A. KIRKPATRICK

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Appeal No. 1999-2070
Application 08/611,899[1]

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ON BRIEF

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Before THOMAS, FLEMING, and GROSS, ***Administrative Patent Judges***.

FLEMING, ***Administrative Patent Judge***.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-3, 5-16 and 18-20, all the

[1] Application for patent filed March 6, 1996.

claims pending in the instant application. Claims 4 and 17 have been cancelled.

The instant invention relates to voltage limiters using field emission techniques to limit the voltage on radio frequency transmission lines. Appellants' Specification, page 1, lines 3-5. Specifically, the present invention provides a voltage limiter having a large bandwidth to prevent large voltages on a transmission line from destroying sensitive electronic components. Specification, page 4, lines 24-27. The voltage limiter uses field emitters to generate an electron flow above a predetermined breakdown threshold voltage without the need for an external electrical source to induce the electron flow. Specification, page 4, lines 24-27. The invention also includes a microstrip transmission line that electrically contacts a selected group of the field emitters. Specification, page 5, lines 1-6. Since the field emitters are arranged as an array having a predetermined distribution per unit area, the width of the microstrip determines the number of field emitters used. Specification, page 5, lines 4-10. The number of field emitters used affects the total power handling capability of the voltage limiter.

Specification, page 5, lines 4-10. The field emitter limiter of the invention is implemented as illustrated below in Figure 3.

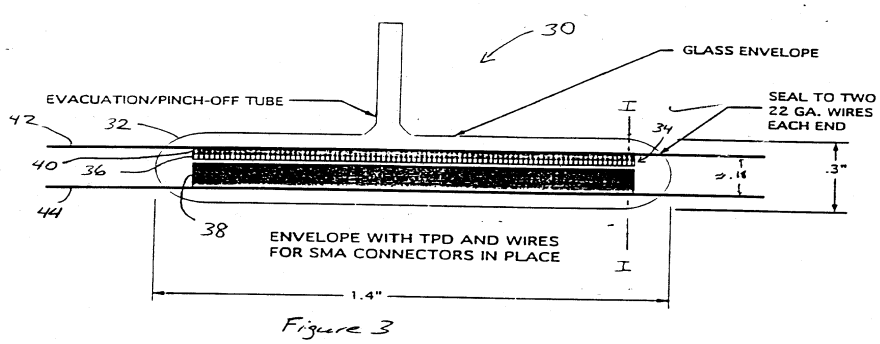

Figure 3

The field emitter limiter 30 includes a vacuum envelope 32 housing a cathode 34 comprising a field emitter array having a plurality of emitters(field effect tips, 36, 36a), spaced from an anode 38 serving as a conducting ground plane. The cathode also comprises a microstrip transmission line 40, coupled to a selected group of the emitters 36 distributed about the surface of an insulating layer 46. Lead wires 42 and 44

exiting the envelope 32 connect the cathode 34 and the anode 38 to a transmission line circuit. Figure 4, shown below, illustrates the details of the microstrip transmission line 40 and the emitters.

Representative claim 1 reads as follows:

1. A voltage limiter comprising:

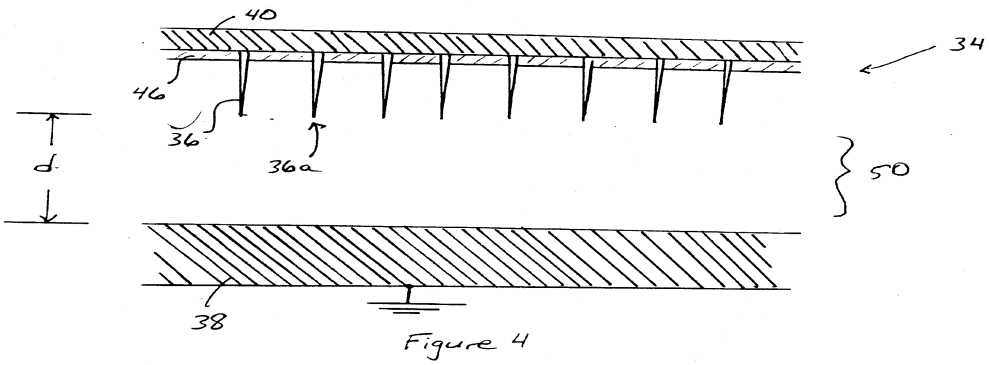

Figure 4

a cathode including:

(a) a field emitter array having an insulating

layer and a plurality of field tips distributed about the surface of the insulating layer and each field tip having a proximal end passing through the insulating layer and a distal end at substantially a predetermined distance from the surface of the insulating layer, and

(b) a microstrip transmission line overlying the insulating layer and having a predetermined width causing electrical contact with a selected group of said field tips at the proximal end thereof; and

an anode having a first distance from the surface of the insulating layer and a second distance from the distal ends of said field tips.

In rejecting Appellants' claims, the Examiner relies on the following references:

Shelton et al. (Shelton)	3,746,905	Jul. 17, 1973
Gray et al. (Gray)	4,987,377	Jan. 22, 1991
Johnson et al. (Johnson)	5,097,231	Mar. 17, 1992

Claims 1-3, 5, 10-12, 15, 16, and 20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Gray. Claim 6 stands rejected under 35 U.S.C. § 103(a) as obvious over Gray. Claims 1-3, 5-16 and 18-20 stand rejected under 35 U.S.C. § 103(a) as obvious over Shelton and Johnson. Rather than repeat the arguments of the Appellants and Examiner, we refer

the reader to the Appellants' Brief[2] and Examiner's Answer[3] for the respective details thereof.

OPINION

With full consideration being given the subject matter on appeal, the Examiner's rejection and the argument of Appellants and Examiner, for the reasons stated infra, we will reverse the Examiner's rejection of claims 1-3, 5, 10-12, 15, 16, and 20 under 35 U.S.C. § 102(b) as being anticipated by Gray. We will reverse the Examiner's rejection of claim 6 under 35 U.S.C. § 103(a) as unpatentable over Gray. We will also reverse the Examiner's rejection of claims 1-3, 5-16 and 18-20 under 35 U.S.C. § 103(a) as unpatentable over Shelton and Johnson.

We first turn to the 35 U.S.C. § 102 rejections.

"A rejection for anticipation under section 102 requires that each and every limitation of the claimed invention be disclosed in a single prior art reference." ***In re Paulsen***, 30

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[2]Appellants filed a Brief on Appeal ("Brief")on September 30, 1998. This Brief was deemed non-compliant under 37 CFR 1.192(c). Appellants subsequently filed an amended Brief ("Brief") on November 6, 1998.

[3]The Examiner, in response to Appellants' Brief, mailed an Examiner's Answer on December 22, 1998.

F.3d 1475, 1478-79, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994). In addition, the reference must be enabling and describe the applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. ***Id***. The first step of an anticipation analysis is claim construction. ***Helifix Ltd. v. Blok-Lok Ltd.***, 208 F.3d 1339, 1346, 54 USPQ2d, 1299, 1303 (Fed. Cir. 2000). It is already well-settled that claim construction includes a review of the claim language and the specification. ***See Vitronics Corp. v. Conceptronic, Inc.***, 90 F.3d 1576, 1582-83, 39 USPQ2d 1573, 1576-77 (Fed. Cir. 1996). Ordinary principles of claim construction requires that "claim language be given its ordinary and accustomed meaning except where a different meaning is clearly set forth in the specification or where the accustomed meaning would deprive the claim of clarity." ***Northern Telecom Ltd. V. Samsung Electronics Co.***, 215 F.3d 1281, 1287, 55 USPQ2d 1065, 1069.

We now consider the arguments presented for independent claim 1.

Appellants first argue that Appellants are not claiming an amplifier as indicated by the Gray patent entitled "Field

Emitter Array Integrated Distributed Amplifiers." Brief at page 8, lines 5-8. Appellants further state that although field emitters are used in Gray and claimed by Appellants, Appellants' use of field emitters does not involve amplification. Brief at page 8, lines 9-12. Appellants next compare Appellants' invention to Gray and state that Appellants use a diode structure while Gray uses a gridded structure. Brief at page 8, lines 20-21. Appellants assert that Grays' grids create a tetrode like structure that is not present in Appellants' device. Brief at page 8, lines 12-16. In fact, Appellants continue, that then device does not require grids for operation at all as in the case of Gray. Brief at page 8, lines 18-21. Appellants, while conceding that Gray uses dielectric materials, contend that the materials are used for a different reason. Brief at page 9. Finally, Appellants summarize by asserting that the devices of Gray and Appellants are fundamentally different because Gray claims an amplifier and Appellants' invention is a voltage limiter. Brief at page 10, lines 3-5.

The Examiner responds that Appellants' arguments are not persuasive because the recited limitations of claim 1 are met

by the Gray reference. Examiner's Answer at page 7. The Examiner continues, "Although the preamble of the claim recites 'voltage limiter', it has not been given any patentable weight because it merely recites the intended use of the structure[,] and the body of the claim does not depend on the preamble for completeness but, instead, the structural limitations are able to stand alone." Examiner's Answer at page 7.

We note that claim 1 requires the limitation "voltage limiter". Gray discloses a distributed amplifier. A voltage limiter and a distributed amplifier are two very different devices. Furthermore, the term "voltage limiter" cannot be construed to include a "distributed amplifier" within its scope and meaning. Although the term "voltage limiter" is confined to the claim preamble, we accord the term patentable weight because it gives meaning to the claim and defines the claimed invention.

The Federal Circuit has stated that "[a]lthough no 'litmus test' exists as to what effect should be accorded to words contained in a preamble, review of a patent in its entirety should be made to determine whether the inventors

intended such language to represent an additional structural limitation or mere introductory language." ***In re Paulsen***, 30 F.3d at 1478-79, 31 USPQ2d at 1673, (Fed. Cir. 1994). If the body of a claim fully sets forth the complete invention, including all of its limitations, and the preamble is not "necessary to give life, meaning, and vitality to the claim" and moreover, offers no distinct definition of any of the claimed invention's limitations, but rather merely states the purpose or intended use of the invention, then the preamble is of no significance to claim construction because it cannot be said to constitute or explain a claim limitation. ***Pitney Bowes, Inc. v. Hewlett-Packard Co.***, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165-66, (Fed. Cir. 1999).

Upon review of Appellants' application in entirety, we find that the preamble of claim 1 which recites, in part, "[a] voltage limiter" gives "life, meaning, and vitality to the claim." Therefore, in order to anticipate claim 1, the prior art reference of Gray must disclose a device compable of functioning as a voltage limiter. We find, however, that Gray discloses a distributed amplifier. A distributed amplifier is not a type of voltage limiter nor could it ever be construed

as such. Based on this finding, we conclude that Gray does not anticipate claim 1. Accordingly, we reverse the Examiner's rejection of Claim 1 as anticipated by Gray.

The preamble of independent claim 15 similarly recites in part "[A] voltage limiter. . . ." Because Gray does not teach a "voltage limiter", we find that Gray does not anticipate independent claim 15. Accordingly, we also reverse the Examiner's rejection of Claim 15 as anticipated by Gray. The dependent claims included under the umbrella of the 35 U.S.C. § 102 rejections all require the limitation of a "voltage limiter". Accordingly, we likewise reverse the Examiner's rejection of claims 2, 3, 5, 10-12, 16, and 20 as anticipated by Gray.

We now address the 35 U.S.C. § 103 rejections.

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a ***prima facie*** case of obviousness. ***In re Attacher***, 977 F.2d 1443, 1445, 24 USPQ 1443, 1444 (Fed Cir. 1992). ***See also In re Piasecki***, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to

one of ordinary skill in the art suggests the claimed subject matter. ***In re Fine***, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. ***In re Attacher***, 977 F.2d at 1445, 24 USPQ at 1444. ***See also In re Piasecki***, 745 F.2d at 1472, 223 USPQ at 788 ("After a prima facie case of obviousness has been established, the burden of going forward shifts to the applicant.").

An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. ***See In re Attacher***, 977 F.2d at 1445, 24 USPQ2d at 1444 ("In reviewing the examiner's decision on appeal, the Board must necessarily weigh all of the evidence and argument."). With these principles in mind, we now turn to consider the arguments related to claim 6.

Claim 6 recites as follows:

6. A limiter as in claim 1, wherein said insulating layer is formed of silicon and said field tips are formed of tantalum silicide.

We have already established that Gray does not teach a voltage limiter. Gray teaches a distributed amplifier. We

further find that Gray does not suggest a voltage limiter. Without an objective teaching or suggestion of a "voltage limiter" in the prior art, the Examiner cannot satisfy the initial burden of establishing a ***prima facie*** case of obviousness. Therefore, we reverse the Examiner's rejection of Claim 6 as obvious over Gray.

We consider now the rejection of claims 1-3, 5-16 and 18-20 as unpatentable over Shelton and Johnson.

Appellants contend that Shelton will not operate at microwave frequencies because the capacitance of the high vacuum field effect electron tube will be a lumped impedance element in a microwave circuit. Brief at page 11, lines 8-11. Appellants further assert that lumped impedance elements require reactive tuning to negate their effect. Brief at page 11, lines 11-12. Appellants additionally state that the reactive tuning limits the bandwidth of the device making it unsuitable for microwave applications. Brief at page 11, lines 12-14. By contrast, Appellants assert that Appellants use a microstrip format for the implementation of the field array limiter. Brief at page 11, lines 14-16. Finally, Appellants assert that Shelton never mentions operation in the

microwave region and never envisioned operation at microwave frequencies. Comparing the Johnson prior art, Appellants contend that Appellants' device does not require an ionizable gas whereas Johnson requires that the discharge chamber contain a gas. Brief at page 12, lines 12-19. Additionally, Appellants assert that Appellants' invention does not use the field emitter array to initiate a discharge. Brief at page 12, lines 23-24. Appellants state that in Appellants' invention, the electrons emitted by the array directly provide a low impedance across the transmission lines thus acting as a limiter (receiver protector). Brief at pages 12, line 24 to page 13, line 2. This, Appellants state further, is a fundamental difference between Johnson and Appellants' invention. Brief at page 13, lines 2-3.

The Examiner first argues that Appellants' assertion stating that the Shelton device will not work lacks objective evidence. Examiner's Answer at page 8. Additionally, Examiner argues that the claims do not appear to recite a microwave frequency range. Examiner's Answer at page 8. With respect to the Johnson reference, Examiner states that the Johnson reference is relied upon for its teachings of RF

applications and the use of a microstrip transmission line with a field emitter array. Examiner's Answer at page 9. The Examiner concludes that Appellants' arguments are not convincing because they do not address the rejection based on the obvious combination of the references [Shelton and Johnson]. Examiner's Answer at page 9.

In reviewing claim 1, we focus on the limitation which Appellants impliedly state is lacking in the prior art of Shelton. That limitation at claim 1, lines 11-14 recites:

> (b) a microstrip transmission line overlying the insulating layer and having a predetermined width causing electrical contact with a selected group of said field tips at the proximal end thereof.

We find, and Examiner additionally has conceded, that Shelton does not teach this limitation. Turning to Johnson, we find mention of a microstrip transmission line at column 5, lines 39-43. There, Johnson discloses,

> The field emission array 60 in this configuration functions as a microstrip transmission line having emitters 82 spaced along it, and the RF field within the receiver protector device is capacitively coupled to the field emission array.

However, the mere mention of a microstrip transmission line in Johnson is insufficient to cure the deficiency of Shelton here, where the Johnson reference is devoid of the

rest of the claim limitation that specifically requires the microstrip transmission line “overlying the insulating layer and having a predetermined width causing electrical contact with a selected group of said field tips at the proximal end thereof;”. We find that Johnson fails to close the gap by supplying the missing claimed limitation.

Moreover, even if we were to find that Johnson teaches a microstrip transmission line as claimed by Appellants, we would find no reason to combine Shelton with Johnson. The microstrip transmission line enables propagation of electromagnetic microwave energy over a bandwidth of multiple octaves. Specification, page 5, lines 1-4. However, the Shelton prior art does not teach, suggest or otherwise enable operation of its invention at microwave frequencies. Therefore, there would be no reason to combine the microstrip transmission line of Johnson with Shelton.

The Federal Circuit instructs that "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." ***In re Fritch***, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84

n.14 (Fed. Cir. 1992), ***citing In re Gordon***, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). It is further established that "[such a suggestion may come from the nature of the problem to be solved, leading inventors to look to references relating to possible solutions to that problem." ***Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc***., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996), ***citing In re Rinehart***, 531 F.2d 1048, 1054, 189 USPQ 143, 149 (CCPA 1976)(considering the problem to be solved in a determination of obviousness). The Federal Circuit reasons in ***Para-Ordnance Mfg. Inc. v. SGS Importers Int'l Inc.***, 73 F.3d 1085, 1088-89, 37 USPQ2d 1237, 1239-40 (Fed. Cir. 1995), that for the determination of obviousness, the court must answer whether one of ordinary skill in the art who sets out to solve the problem and who had before him in his workshop the prior art, would have been reasonably expected to use the solution that is claimed by the Appellants. However, "[o]bviousness may not be established using hindsight or in view of the teachings or suggestions of the invention." ***Para-Ordnance Mfg. v. SGS Importers Int'l***, 73 F.3d at 1087, 37 USPQ2d at 1239, ***citing W.L. Gore & Assocs.***, ***Inc. v. Garlock, Inc.***, 721 F.2d 1551,

1553, 220 USPQ 311, 312-13. In addition, our reviewing court requires the PTO to make specific findings on a suggestion to combine prior art references. **In re Dembiczak**, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19 (Fed. Cir. 1999).

Based on the foregoing, we conclude that the Examiner has failed to establish a ***prima facie*** case of obviousness with respect to claim 1. Accordingly, we reverse the Examiner's rejection of claim 1 and its dependent claims as obvious over Shelton and Johnson.

Turning to independent claim 15, we note that this claim also requires "a microstrip transmission line". We have already established that neither Shelton nor Johnson teaches or suggests "a microstrip transmission line". Therefore, we find that the Examiner has failed to establish a ***prima facie*** case of obviousness with respect to claim 15. Accordingly, we reverse the Examiner's rejection of claim 15 and its dependent claims as obvious over Shelton and Johnson.

In summary, we reverse the Examiner's rejection of claims 1-3, 5, 10-12, 15, 16, and 20 under 35 U.S.C. § 102(b) as being anticipated by Gray. We reverse the Examiner's

rejection of claim 6 under 35 U.S.C. § 103(a) as unpatentable over Gray. We

also reverse the Examiner's rejection of claims 1-3, 5-16 and 18-20 under 35 U.S.C. § 103(a) as unpatentable over Shelton and Johnson.

REVERSED

JAMES D. THOMAS Administrative Patent Judge	)	
MICHAEL R. FLEMING Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
ANITA PELLMAN GROSS Administrative Patent Judge	)	

Appeal No. 1999-2070
Application 08/611,899

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